

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of)
)
Rulemaking under Part 97 of)
the Communications Act of 1934,)
as amended to Establish Technical)
Standards for Certain Amateur)
Radio Telephony Transmissions)

Docket No. _____

To: The Commission

PETITION FOR RULEMAKING

Submitted by:

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Petitioners.

1.0 Introduction

Part 97 of the Rules and Regulations of the Federal Communications Commission provides that amateur radio licensees may operate on several frequency bands, using various types of emissions. By far the most popular of these emission types is Suppressed Carrier Single Sideband, designated as J3E and generally referred to as "SSB." Because of its popularity and the growing number of Amateur Radio operators using SSB, many of the amateur frequency bands become quite crowded. The aim of those forward-thinking Amateurs who, in 1947, adapted SSB to Amateur Radio was to reduce the occupied bandwidth of radiotelephony signals. This reduction in signal width has permitted many more stations to use the amateur bands than was possible when full-carrier, amplitude modulated telephony (such as is heard on the standard AM broadcast band, emission type A3E) was widely used.

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In the Forward to the 1965 edition of the American Radio Relay League's *Single Sideband for the Radio Amateur*, the then General Manager of the ARRL, John Huntoon wrote, "Sideband, through elimination of carrier heterodynes and reduction of channel width, has remarkably improved the communication capacity of our phone bands."

Responsible amateurs, seeking even narrower radiotelephone signals, amateurs worked assiduously to develop new, lower bandwidth modes of voice communication. The ARRL published details describing a scheme for "Amplitude Compandered SSB." ACSSB can pack about four times more voice transmission in a given band than FM, but it never gained popularity either in commercial service or among amateurs. SSB did, and amateurs established a *de facto* maximum signal bandwidth of about three kilohertz across the HF amateur bands.

For more than fifty years, this maximum bandwidth standard for SSB has been acknowledged, honored and adopted by amateur radio operators. It allows an acceptable quality of voice transmission and maximizes the number of stations that can fit within the finite limits of the amateur bands. However, within the last few years, at least two groups of amateur operators have cast aside the *de facto* SSB signal width of approximately 3 kHz on the high-frequency amateur bands, and have purposely adjusted or misadjusted their equipment in order to transmit what the Commission's Enforcement Division recently described as "an emission that occupies more bandwidth than necessary."¹ One group appears on the amateur bands during international radio contests, tweaking and adjusting their transmitters to splatter purposely, in order to provide themselves "elbowroom" during a contest on a very crowded band. Another group has begun experimenting with transmitting "high-fidelity" audio, apparently seeking to simulate on the crowded HF radiotelephony bands the sound heard usually on the FM broadcast band. This practice has resulted in the transmitting daily, of extremely wide signals on crowded amateur bands and has, according to the Commission's Enforcement Division, generated up to twenty complaints per week to the Commission.

Until recently, amateurs were self-policing and those who inadvertently transmitted wide, offensive signals, when notified of it, took corrective action. The two groups described above ignore the entreaties of reasonable amateurs to behave as the vast majority of other amateurs behave, and limit their signals to the *de facto* bandwidth standards common in amateur operating practice. Instead, they purposely broaden their signals.

In April 2003, the Commission's Enforcement Division sent letters to four amateur station licensees concerning this matter. Notably absent in the letters from Riley Hollingsworth to the offending stations was any clear citation of a standard for SSB transmission bandwidth. That is because Part 97 of the Commission's Rules contains none. The Petitioners hereby and herewith petition the Commission to establish SSB transmission bandwidth standards, *de jure*, as suggested in paragraph 3.0 below, in order to remove the ambiguity of the Commission's Rules and to provide a clear basis for amateur practice and enforcement action when it is required.

¹ See, in the Appendix, letters by Riley Hollingsworth, FCC Enforcement Division dated April 3, 2003.

2.0 Background

2.1 Regarding Single Sideband Transmission:

The Commission directs in 97.307(a) of its rules, that “No amateur station transmission shall occupy more bandwidth than necessary for the information rate and emission type being transmitted, in accordance with good amateur practice.” It seems clear to the Petitioners that the Commission intends to limit certain amateur emission bandwidths, *de jure*. For example, 97.307(f)(2) contains reference to a “*communications quality A3E emission*.” It is apparent to the Petitioners that the Commission has in mind “*communications quality*” when referencing A3E transmission. Mr. Hollingsworth has written, “The Amateur Service is *not* a substitute for the broadcast service, and the frequencies allocated to the Amateur Service were *not* allocated for “broadcast quality” audio emission or sound.” We agree with Mr. Hollingsworth, but the very limitations the Commission so clearly has in mind are not clearly described in or imposed by Part 97.

As the Commission well knows, numerous serious scientific studies have established that voice communication wide enough to provide “naturalness” is achievable using audio modulating frequencies of from 300 to 3,000 Hz. In practice many amateur SSB transmissions contain frequencies down to about 70 or 80 Hz and create no problems for adjacent stations. It is the emphasis on and transmitting of modulating frequencies above 3,000 Hz that are largely responsible for unnecessary bandwidth in the case of so-called “Hi-Fi Audio” SSB transmission, excoriated by Hollingsworth and hundreds of complaining amateurs.² In the other cases mentioned in this Petition, overmodulation, intended and unintended, causes similarly wide signals to be transmitted.

2.2 Retention of AM (A3E) and establishment of *de jure* bandwidth limitation for it:

Amplitude Modulation (full-carrier, Double-Sideband, A3E) continues to provide a large number of amateurs with an avenue for experimentation and development. To the Petitioners’ knowledge, AM operators have not purposely tried to broaden their signals. Use of AM, while growing again in popularity, does not create the same problems that the burgeoning use of so-called “Hi Fi Single Sideband” creates. A very small percentage of Amateurs use AM, whereas, a high percentage of amateurs holding a General Class or higher license, have SSB capabilities on the HF amateur bands.

As with SSB, the highest modulating frequencies largely determine the bandwidth of an A3E radiotelephony signal, unless it is overmodulated.

² See Appendix, Exhibit II. This excerpted material found on the www. NU9N.com website demonstrates the emphasis these operators place upon purposely transmitting audio signals higher in frequency than 3 kHz and the necessity of obtaining a transmitter capable of doing so.

3.0 Suggestions for *de jure* standards

The Amateur Service has a long history of policing itself. This is evident from the latitude and liberality in the Commission's rules regulating the Amateur Service. The Petitioners are unaware of an instance where amateurs have petitioned the Commission to establish stricter rules or standards than those extant. However, this situation begs attention and action so that the many thousands of amateurs who use the amateur bands responsibly and keep "good amateur practice" can obtain relief from and protection against the opprobrious and intentional actions already described in this Petition.

The Petitioners herewith and hereby petition the Commission to amend Part 97 of the Communications Act of 1934, as amended, to provide that:

No amateur station transmission using J3E shall occupy more than 2.8 kHz bandwidth on any amateur frequency below 28.8 Mhz., and,

No amateur station transmission using A3E shall occupy more than 5.6 kHz bandwidth on any amateur frequency below 28.8 Mhz.

The Petitioners believe these are reasonable and needed limitations that will provide relief and protection to all in the Amateur Service. Those who insist on occupying unusual amounts of spectrum can operate above 28.8 Mhz.

In no way do the Petitioners suggest or support the "channelization" of the amateur bands, nor do the Petitioners suggest or support the establishment of "type-acceptance" for amateur transmitters. The Petitioners believe that only those regulations necessary to control and restrict bandwidth of SSB and AM signals should be imposed and nothing more. So strongly do the Petitioners feel about this, that if "channelization" or "type-acceptance" should be suggested as a remedy, the Petitioners would withdraw this Petition.

4.0 Petitioner's Discussion of Practical Issues facing Amateurs in meeting *de jure* Standards.

The Commission has always considered the practicability of implementation when imposing limits and standards upon licensees. In this case, the Petitioners believe that limiting modulating frequencies and proper adjustment of modulation levels are practical and that they are the two keys to limit bandwidth to any new *de jure* standards. Unless something is done to alleviate this problem the communications capacity of the amateur radiotelephony bands will continue to be reduced, perhaps to the point where emergency communications could be hampered or made impossible by splatter from broad and overmodulated stations.

The Petitioners are aware that many amateur transmitters would already meet a 2.8 kHz *de jure* standard if imposed. For those transmitters that would not meet the standard, a simple "high pass" audio circuit could be installed between a microphone of a station and the microphone input. Such a circuit could easily be constructed for a cost of less than \$15 and probably purchased for around \$25. Most certainly such a device will not guarantee that signals wider than *de jure* standards do not appear but it will go far towards dealing with the problems that are the basis of the complaint in this Petition.

5.0 Summary

The Petitioners seek through this Petition a reasonable solution to a growing problem. That it is a growing problem is evidenced by the prodigious number of complaints submitted to the Commission's Enforcement Division and the directive letters issued by the office of Mr. Hollingsworth.

The Petitioners wish to compliment the Commission's Enforcement Division and in particular, Mr. Hollingsworth for their attention to these problems. They have done all possible to alleviate this situation, given the ambiguity of the Commission's rules on the subject of amateur station emission bandwidths. Our hope is that the ambiguity will be replaced with reasonable, measurable and attainable *de jure* standards.

Respectfully Submitted:

PETITIONERS:

 5/14/03

Michael D. Lonneke, W0YR Date
20732 Furr Road
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 5/14/03

Melvin J. Ladisky, W6FDR Date
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6.0 Appendix and Exhibits

EXHIBIT I.

Letter from Riley Hollingsworth, FCC Enforcement Division, Gettysburg PA to licensee of Amateur Radio Station W2ONV. Letters with the same text were also sent to the licensees of stations NU9N, W9AC and W4NSG.

April 3, 2003
Mr. Sareno J. Salerno
50 Caldwell Avenue
Saddle Brook, NJ 07663

RE: Advisory Notice: Amateur Radio license W2ONV

Dear Mr. Salerno:

The Commission has received numerous complaints regarding the operation of your station. The complaints allege that your station is transmitting an "enhanced single side-band" emission with a bandwidth wider than necessary and contrary to good engineering practice.

While precise measurements of bandwidth may be somewhat complex and the reception of a signal depends, to some extent, on the engineering characteristics of the receiver being used, it is important for you to understand that Section 97.307(a) of the Commission's Rules requires that *no amateur station transmission shall occupy more bandwidth than necessary for the information rate and emission type being transmitted*, in accordance with good amateur practice [emphasis added]." Wide band overly-processed audio, especially when coupled with the high intermodulation levels of certain amplifiers, results in the use of bandwidths extremely inconsiderate of other operators. Transmitting an emission that occupies more bandwidth than necessary is contrary to the Commission rules and to the expectation that the Amateur Service be largely self-regulated.

The Amateur Service is allocated spectrum that must be shared by thousands of individual stations. The rules require that control operators make the most effective use of amateur frequencies. The Amateur Service is *not* a substitute for the broadcast service, and the frequencies allocated to the Amateur Service were *not* allocated for a "broadcast quality" audio emission or sound. Section 97.101 sets out the general standards amateur stations must follow:

(a) In all respects not specifically covered by FCC rules each amateur station must be operated in accordance with good engineering and good amateur practice.

(b) *Each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the Amateur Service frequencies* [emphasis added]. No frequency will be assigned for the exclusive use of any station. Furthermore, Section 97.101(d) states that no amateur operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal. Section 97.101 applies to all amateur stations at all times.

When an amateur station transmits a voice emission that occupies more bandwidth than necessary in order to achieve a "great audio" sound, that emission occupies spectrum that could be utilized by several other amateur stations. To occupy more bandwidth necessary in a heavily used amateur band is not only *extremely inconsiderate*, but is contrary to requirement that amateur operators cooperate in the utilization of frequencies allocated to them, and make the most effective use of them. Such shortsightedness on the part of control operators that causes a station to transmit an "enhanced single sideband" emission inevitably leads to ill will between operators, and likely will result in petitions for rule making requesting that the Commission establish bandwidth limitations for amateur station emissions.

A hallmark of the Amateur Service is its contribution to the advancement of the radio art. As new technologies have become available to Amateur Radio operators or as they have developed them, control operators have endeavored to introduce these technologies into Amateur Service communications in a way that does not have a negative impact on other amateur stations or their operations. In many cases this has been done by operating on uncrowded amateur spectrum or at times when spectrum used by many amateur stations is not heavily utilized. The many complaints that we are receiving regarding the operation of your station leads to the conclusion that your operation is having a negative impact on the Amateur Radio Service.

Contrary to assertions you may have made on the air, no frequencies in the Amateur Service are designated as "wideband audio" frequencies, either by the Commission or by any informal band plans. Accordingly, you are requested to fully review the rules referenced above, make certain that your station conforms to them and that you operate in the best interests of the Amateur Radio Service as a whole.

CC: Northeast Regional Director, FCC

EXHIBIT II.

Excerpt from "Hi-Fi Audio SSB" website: www.NU9N.com

Note: NU9N was one of the Amateurs who received a letter from the Commission's Enforcement Division, dated April 3, 2003.

Introduction:

Setting Up Your Transmitter Audio

This page was designed to step you through the several different aspects of setting up your transmit audio from component ordering to individual processor settings necessary in achieving that ultimate SSB audio that you have been looking for.

First, let me set the record straight; If you are looking for near AM broadcast quality audio on SSB, then this page was designed for you! If you are looking for something else, I suggest checking out some of the other web pages available for SSB audio that would steer you more toward an articulate upper midrange type of sound. (See the "[Related Sites](#)" page for some of these web sites.)

AM broadcast audio has, by nature, a very wide open, more pleasing sound than the typical Amateur SSB station, with little emphasis on the upper midrange frequencies from 1kHz ~ 3kHz. The idea they have is this: The flatter, the better! Simple!

The typical Amateur Radio SSB audio has a very emphasized midrange characteristic to it by design, especially in the 400Hz ~ 1kHz area. Another attribute with this kind of audio is a severely rolled off bottom end below 300Hz and a tight roll-off above 2.5kHz. While this type of audio has been accepted for some time, and while being very punchy and penetrating regarding weak signal communications, it can be quite fatiguing to listen to after a while.

When the Amateur community embraced SSB for it's narrow bandwidth and saw that it worked good under poor signal conditions, Amateur AM for all practical purposes was abandoned. Fortunately, for those who loved the wider and more pleasing sound of AM, it's still around, barely. However, there has been a resurgence for "Quality" modulation in the Single Sideband domain while still remaining relatively narrow as compared to its full AM modulated counterpart.

Amateur Radio SSB bandwidths can vary depending on the transceiver being used. As a bare minimum, I first of all recommend acquiring a transceiver that is at least capable of 3kHz out of the box before any EQing.

If your transceiver cannot exceed 3kHz on transmit, then forget it! You will not have the necessary bandwidth to physco-acustically sound like AM broadcast!

I'm not saying that anything less than a 3kHz bandwidth will sound bad. I'm only trying

to point out that it will NOT sound remotely close to what AM broadcast sounds like. 3kHz and beyond seems to be the dividing line between sounding "Canned" vs. "Open". (Notice I did NOT say "Natural") If you have ever listened to AM broadcast, you probably noticed that the engineers have made the announcers sound very rich and powerful. Several time I have listened carefully to female announcers and have noticed that they sound very rich and full, certainly nothing like they would sound like in person! Why? Marketing! They know what sells and how to keep their market share. So, even though a perfect reproduction of our voices would be ideal, it isn't going to happen because of our limited bandwidth. Instead, like AM, the best we can do is manipulate the audio in such a way as to keep the audio as rich and full as we can.

The SSB "Mid-fi" station sounded excellent! Not exactly like AM broadcast, but closer than the typical SSB audio without being a full 6kHz wide. In fact, this station was about 3.5kHz wide. More importantly, the station was clean with excellent carrier suppression and extremely low I.M.D. (Inter-Modulation Distortion) products. This actually contributes to less bandwidth overall than some stations running a 2.4kHz bandwidth with poor I.M.D., sometimes making them as much as 10kHz wide!

The next graph displays an SSB Hi-fi station with a transmit passband of 6kHz. This is truly approaching AM broadcast quality sound with only half of the necessary RF bandwidth required compared to AM since an AM station would have to occupying a 12kHz RF bandwidth to produce 6kHz of audio bandwidth.